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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/720,725	03/18/2004	Pei-Chung Wang	GP-302676	2760

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EXAMINER	
BEVERIDGE, RACHEL E	
ART UNIT	**PAPER NUMBER**
1725	

DATE MAILED: 10/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/720,725	WANG ET AL.	
	Examiner	Art Unit	
	Rachel E. Beveridge	1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 August 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-16 and 23-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-7,11-16 and 23-26* is/are rejected.

7)☒ Claim(s) *9 and 10* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-2, 4-6, 11-14, and 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Branch et al. (US 3,219,789) in view of Morris et al. (US 3,197,611) and Sakai (US 6,20,453 B1).

With respect to claims 1-2, 4-6, 11-12, and 23-26, Branch discloses his invention relating to welding with particular regard to the formation of the weld root in an arc welding process (Branch et al., col. 1, lines 9-11). Branch discloses a vessel (10) of circular cross-section with opposing cylindrical segments (11,12), which are identically formed at their adjoining ends to define a circular joint (13) (col. 1, lines 49-52). See figure 1. Branch teaches arranging the welding apparatus with the welding tool (15) closely overlying the supported vessel (10) and the shielding head (46) directly below the weld area at the highest portion of the joint (13) and is opposite of the welding tool (15) (col. 3, lines 33-38). See figure 1. Branch discloses rotatably and slidably mounting a body (37) onto a support rod (25) within a vessel (10), with a portion of the body transverse to the plane of the joint (13) (col. 2, lines 55-58). Branch discloses holding the body (37) in a selected position so that the shielding gas follows a path beginning at the inlet of the support rod (25) with a gas filled passage (33), and

terminates at the outlet of the cup-shaped head (46) (col. 2, lines 58-70). See figures 1 and 3. Furthermore, Branch teaches that the parts are arranged so that "gas under pressure is permitted to flow from passage (33) through port (42) to chamber (41) and then by communicating connections through flexible tube (44) to head (46) where it is free to discharge as a directed stream through porous cover (47) directly upon the inner surface of joint (13)" (col. 3, lines 22-28). Branch discloses progressively forming the weld around the vessel (10) (col. 3, line 43). However, Branch lacks disclosure of the flexible tubing comprising a plurality of rings. Morris discloses a casing (1) formed by a corrugated tube of metal which may be bent repeatedly without great effort, yet will hold a position against the forces of normal use (Morris et al., col. 2, lines 5-9). Morris also discloses an alternative embodiment in which the tube is corrugated in a bellows-like form and made of a malleable material such as brass (see figure 3, for "rings" of the flexible tube) (col. 2, lines 17-20). Furthermore, Morris discloses ferrules (10,11) at each end of the corrugated tubing (col. 2, lines 11-12); thus, it is obvious that there are two ends of the corrugated structure which would lead to a terminal ring towards the weld area and a terminal ring at the inlet of the gas stream. Morris teaches cooling gas passing through the tubing and ferrule (10) to the point of welding, see figures 7-19 (col. 2, lines 63-67). Morris discloses the flexible tubes ability to provide the necessary electrode wire guidance and gas delivery functions required for the welding operation (col. 1, lines 44-46). Furthermore, Morris discloses the passage of inert gas through the casing (1) and out at (10) toward the point of welding, blanketing the point (col. 3, lines 13-16). However, Branch and Morris lack specific disclosure of a control module with a

motion controller comprising electronics and an articulation drive device connected to the plurality of pivot rings. Sakai discloses a control module comprising a motion controller comprising electronics and an articulation drive device operatively connected to the plurality of pivot rings (Sakai, col. 7, lines 55-67 and col. 8, lines 10-14). Sakai also discloses communicating motion control commands from the motion controller to the articulating drive device causing the articulating drive device to pivot (Sakai, col. 7, lines 61-67; col. 8, lines 1-10; and col. 2, lines 31-43). Sakai discloses a flexible articulate tubular device further comprising a protective sheath (16) over the plurality of pivot rings (col. 5, lines 29-34 and figure 2) [claim 23]. Sakai also discloses the flexible articulate tubular device further comprising a plurality of wires attached to the plurality of pivot rings and connected to the articulation drive device for applying a tensile force to one or more of the plurality of pivot rings (col. 7, lines 55-67 and col. 8, lines 1-14) [claim 24], and the flexible articulate tubular device further comprising a position drive device and further comprising communicating motion control commands from the motion controller to the position control device to the articulate said flexible articulate tubular device (Sakai's drive motor and sensor) (col. 7, lines 55-67 and col. 8, lines 1-14) [claim 25]. Furthermore, Sakai discloses each one of the plurality of pivot rings comprising two opposing undulating surface forming two protruding portions formed at 180 degrees from each other on each of the axial sides of each pivot ring such that mating sides of adjacent pivot rings are in direct contact (see figures 2 and 3(12a); see figure 4 and col. 6, lines 1-12; and see figure 7 and col. 8, lines 28-44). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify

the invention of Branch to include the corrugated rings of Morris in order to maintain the actuated positioning of the welding torch and tubing by resisting any internal tendency to straighten out (Morris et al., col. 2, lines 15-17), and further to modify the combined invention of Branch and Morris to include the motion controller and tubular ring structure of Sakai in order to provide a bending device of high operability and productivity for an examining insertion tube (Sakai, col. 1, lines 57-58).

Regarding claims 13-14, Branch shows an upperside and underside of the vessel (10) assembly in figure 1. The upperside being the outside of the vessel (10), and the underside being the inside of the vessel (10). Branch discloses his invention relating to welding with particular regard to the formation of the weld root in an arc welding process (Branch et al., col. 1, lines 9-11). Branch discloses a vessel (10) of circular cross-section with opposing cylindrical segments (11,12), which are identically formed at their adjoining ends to define a circular joint (13) (col. 1, lines 49-52). See figure 1. Branch teaches arranging the welding apparatus with the welding tool (15) closely overlying the supported vessel (10) and the shielding head (46) directly below the weld area at the highest portion of the joint (13) and is opposite of the welding tool (15) (col. 3, lines 33-38). See figure 1. The shielding gas follows a path beginning at the inlet of the support rod (25) with a gas filled passage (33), and terminates at the outlet of the cup-shaped head (46) (col. 2, lines 62-70). See figures 1 and 3. Furthermore, Branch teaches that the parts are arranged so that "gas under pressure is permitted to flow from passage (33) through port (42) to chamber (41) and then by communicating connections through flexible tube (44) to head (46) where it is free to discharge as a directed stream through

porous cover (47) directly upon the inner surface of joint (13)" (col. 3, lines 22-28). Branch discloses progressively forming the weld around the vessel (10) (col. 3, line 43). However, Branch lacks disclosure of the flexible tubing comprising a plurality of rings. Morris discloses a casing (1) formed by a corrugated tube of metal which may be bent repeatedly without great effort, yet will hold a position against the forces of normal use (Morris et al., col. 2, lines 5-9). Morris also discloses an alternative embodiment in which the tube is corrugated in a bellows-like form and made of a malleable material such as brass (see figure 3, for "rings" of the flexible tube) (col. 2, lines 17-20). Furthermore, Morris discloses ferrules (10,11) at each end of the corrugated tubing (col. 2, lines 11-12); thus, it is obvious that there are two ends of the corrugated structure which would lead to a terminal ring towards the weld area and a terminal ring at the inlet of the gas stream. Morris teaches cooling gas passing through the tubing and ferrule (10) to the point of welding, see figures 7-19 (col. 2, lines 63-67). Morris discloses the flexible tubes ability to provide the necessary electrode wire guidance and gas delivery functions required for the welding operation (col. 1, lines 44-46). Furthermore, Morris discloses the passage of inert gas through the casing (1) and out at (10) toward the point of welding, blanketing the point (col. 3, lines 13-16). However, Branch and Morris lack specific disclosure of a control module with a motion controller comprising electronics and an articulation drive device connected to the plurality of pivot rings. Sakai discloses a control module comprising a motion controller comprising electronics and an articulation drive device operatively connected to the plurality of pivot rings by a plurality of wires (Sakai, col. 7, lines 55-67 and col. 8, lines 10-14). Sakai also discloses

communicating motion control commands from the motion controller to the articulating drive device causing the articulating drive device to apply a tensile force to one or more of the wires to pivot (Sakai, col. 7, lines 61-67; col. 8, lines 1-10; and col. 2, lines 31-43). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of Branch to include the corrugated rings of Morris in order to maintain the actuated positioning of the welding torch and tubing by resisting any internal tendency to straighten out (Morris et al., col. 2, lines 15-17), and further to modify the combined invention of Branch and Morris to include the motion controller and tubular ring structure of Sakai in order to provide a bending device of high operability and productivity for an examining insertion tube (Sakai, col. 1, lines 57-58).

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Branch et al. (US 3,219,789), Morris et al. (US 3,197,611), and Sakai (US 6,270,453) as applied to claim 1 above, and further in view of Corby, Jr. et al. (US 4,532,405).

Branch teaches arranging the welding apparatus with the welding tool (15) closely overlying the supported vessel (10) and the shielding head (46) directly below the weld area at the highest portion of the joint (13) and is opposite of the welding tool (15) (col. 3, lines 33-38). See figure 1. The shielding gas follows a path beginning at the inlet of the support rod (25) with a gas filled passage (33), and terminates at the outlet of the cup-shaped head (46) (col. 2, lines 62-70). See figures 1 and 3. Furthermore, Branch teaches that the parts are arranged so that "gas under pressure is permitted to flow from passage (33) through port (42) to chamber (41) and then by

communicating connections through flexible tube (44) to head (46) where it is free to discharge as a directed stream through porous cover (47) directly upon the inner surface of joint (13)" (col. 3, lines 22-28). Branch discloses progressively forming the weld around the vessel (10) (col. 3, line 43). Branch does not disclose visual signals from an optical element on the terminal pivot ring of the tubular device used for directing shielding gas at the underside of the weld site. However, Morris discloses the privot ring structure as previously discussed and Corby illustrates optical cables for transporting visual signals from the terminus of a welding device in figure 1. Corby also discloses that these cables are "flexible coherent fiber optic bundles" (Abstract, lines 3-4). Furthermore, Corby states that an image of the weld puddle is used as feedback information to change the position of the optical systems (Abstract, lines 8-14). Corby also discloses the optical system (38) comprised of a lens (43) and end face of a fiber optic bundle (23) (col. 3, lines 36-38). Corby discloses that the weld seam is viewed by a central opening (40) in the torch body (24) (col. 3, lines 29-30). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combined invention of Branch, Morris, and Sakai with the addition of the optical signals of Corby in order to optimize the gas metal arc welding device by detecting "weld puddle characteristics and seam to puddle deviation" (Corby, Jr. et al., column 1, lines 30-37).

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Branch et al. (US 3,219,789), Morris et al. (US 3,197,611), and Sakai (US 6,270,453) as applied to claim 14 above, and further in view of Corby, Jr. et al. (US 4,532,405).

Branch does not disclose visual signals from the terminus of the tubular device used for directing shielding gas at the underside of the weld site. However, Corby illustrates optical cables for transporting visual signals from the terminus of a welding device in figure 1. Corby also discloses that these cables are "flexible coherent fiber optic bundles" (Abstract, lines 3-4). Furthermore, Corby states that an image of the weld puddle is used as feedback information to change the position of the optical systems (Abstract, lines 8-14). Corby also discloses the optical system (38) comprised of a lens (43) and end face of a fiber optic bundle (23) (col. 3, lines 36-38). Corby discloses that the weld seam is viewed by a central opening (40) in the torch body (24) (col. 3, lines 29-30). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combined invention of Branch, Morris, and Sakai with the addition of the optical signals of Corby in order to optimize the gas metal arc welding device by detecting "weld puddle characteristics and seam to puddle deviation" (Corby, Jr. et al., column 1, lines 30-37).

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Branch et al. (US 3,219,789), Morris et al. (US 3,197,611), and Sakai (US 6,270,453) as applied to claim 13 above, and further in view of Berg et al. (US 6,888,972 B2).

Branch does not disclose temperature sensors from the terminus of the tubular device used for directing shielding gas at the underside of the weld site. However, Berg discloses TIG welding of cylindrical structures with fibers present (Column 19, lines 60-62). Berg states that precautions should be taken to ensure that the heat generated during the welding process does not damage the fibers (Column 20, lines 7-11). Berg also discloses TIG welding that is "confined between the weld and the base metal at the point of fusion so that a narrow heat affected zone is produced" (Column 20, lines 13-16). Furthermore, Berg discloses the temperature sensors for welding directed to "a multiple component sensor mechanism capable of being pre-assembled and used in numerous applications and environments" (Column 22, lines 39-42). Berg also states the fiber optic sensors to be located where near the "sensitive" portion so that the fiber optic wraps are modulated to detect an event of interest (col. 23, lines 1-3 and 12-15) (therefore, the sensors are "responsive" to heat changes). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combined invention of Branch, Morris, and Sakai by adding the temperature measurements of Berg in order to ensure that the assembly process does not sink too much heat leading to a poorer weld joint or too little heat damaging the optical fibers (Berg et al., column 19, lines 62-67).

Allowable Subject Matter

Claims 8-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record does not teach or suggest either alone or in combination positioning the said flexible articulate tubular device so as to trace the said target weld path during the method of metal fusion bonding as recited in claim 1.

Response to Arguments

Applicant's arguments with respect to claims 1, 2, 4-7, and 11-16 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments, see page 9, filed August 9, 2006, with respect to claims 9-10 (also relevant to claim 8) have been fully considered and are persuasive. The rejection of claims 8-10 has been withdrawn.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rachel E. Beveridge whose telephone number is 571-272-5169. The examiner can normally be reached on Monday through Friday, 9 am to 6 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

reb
October 6, 2006

JONATHAN JOHNSON
PRIMARY EXAMINER